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### Abstract

This study compares the sensitivity of temperature variability in ice and snow cover layers and heat flux in ice layer to change in air temperature between 3m thick Arctic sea ice with 40cm thick snow cover and 40cm thick Okhotsk sea-ice with 18cm thick snow cover.

In Arctic sea-ice, only the top 70cm thick layer shows clear sensitivity and the lower layer below this level shows no marked sensitivity to fluctuation in air temperature, even when the air temperature showed as large as 17 °C of change in several days because the ice is covered with thick snow. On the contrary, in Okhotsk sea-ice which has only 18cm thick snow cover, the temperature in both snow cover and ice layers is very sensitive to change in air temperature, even when 10 °C is reached in change in air temperature. The estimated heat flux in ice layer was almost constant at  $8.2 \pm 1.5 \text{ W/m}^2$  at any depth below the sensitive layer in the Arctic sea-ice, however, the heat flux through entire layer of the Okhotsk ice showed a wide range of  $8.7 \pm 8.3 \text{ W/m}^2$ . It was noticed that the heat flux through thinner sea-ice with thinner snow cover like the Okhotsk sea-ice was more sensitive to the change in air temperature. The temperature in ice layer followed the change in air temperature with a few to some hours of delay.